

IN THE CLAIMS:

Claims 1, 2 and 4 through 18 are currently pending in this application. Claims 5 through 16 have been previously withdrawn from consideration. Please cancel Claim 3 without prejudice or disclaimer, please amend Claims 1, 2 and 4 through 12, and please add new Claims 17 and 18, as follows:

1. (Currently Amended) A process for producing a semiconductor device, comprising:
 - a step of forming a gate insulator on a silicon substrate; and
 - a step of forming a gate electrode, a source electrode and a drain electrode on the silicon substrate,
wherein said step of forming the gate insulator includes
a first step of forming a silicon nitride film on the surface of the silicon substrate by irradiating to the silicon substrate nitrogen radicals generated from a radical nitriding apparatus, the radical nitriding apparatus being provided with a plasma chamber for generating nitrogen plasma including the nitrogen radicals, a substrate susceptor, provided outside of the plasma chamber, for supporting the silicon substrate, and ion deflecting means provided between the plasma chamber and the substrate susceptor, and wherein,
in said step of forming a silicon nitride film, more atomic nitrogen radicals are generated than N₂ radicals in the plasma chamber.
2. (Currently Amended) A process for producing a semiconductor device, comprising:
a step of forming a gate insulator on a silicon substrate; and
a step of forming a gate electrode, a source electrode and a drain electrode on the silicon substrate,
wherein said step of forming the gate insulator includes
a first step of forming a silicon nitride film on the surface of the silicon substrate by irradiating to the silicon substrate nitrogen radicals generated from a radical nitriding apparatus, the radical nitriding apparatus being provided with a plasma chamber for generating nitrogen plasma including the nitrogen radicals, a substrate susceptor, provided outside of the plasma chamber, for supporting the silicon substrate, and ion deflecting means provided between the plasma chamber and the substrate susceptor The process according to claim 1, wherein said ion deflecting means are ion deflecting electrodes.

3. (Cancelled)
4. (Currently Amended) The process according to claim 2, wherein, in said step of forming a silicon nitride film, more atomic nitrogen radicals are generated than N₂ radicals in the plasma chamber.
5. (Currently Amended) The process according to claim 1, wherein said step of forming a gate insulator on a silicon substrate further includes a step of forming a silicon ~~exinitride~~ oxi-nitride film, by oxidizing said silicon nitride film after said step of forming a silicon nitride film.
6. (Currently Amended) The process according to claim 2, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a silicon ~~exinitride~~ oxi-nitride film, by oxidizing the silicon nitride film after said step of forming a silicon nitride film.
7. (Currently Amended) The process according to claim 3, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a silicon ~~exinitride~~ oxi-nitride film, by oxidizing the silicon nitride film after said step of forming a silicon nitride film.
8. (Currently Amended) The process according to claim 4, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a silicon ~~exinitride~~ oxi-nitride film, by oxidizing the silicon nitride film after said step of forming a silicon nitride film.
9. (Currently Amended) The process according to claim 1, wherein said step of forming the gate insulator on a silicon substrate further includes a second step of forming a metal film on the silicon nitride film, and a step of forming a silicon ~~exinitride~~ oxi-nitride film and a metal oxide film by oxidizing the silicon nitride film and the metal film, after said step of forming a silicon nitride film.
10. (Currently Amended) The process according to claim 2, wherein said step of forming the gate insulator on a silicon substrate further includes a second step of forming a

metal film on the silicon nitride film, and a step of forming a silicon exnitride oxi-nitride film and a metal oxide film by oxidizing the silicon nitride film and the metal film, after said step of forming a silicon nitride film.

11. (Currently Amended) The process according to claim 3, wherein said step of forming the gate insulator on a silicon substrate further includes a second step of forming a metal film on the silicon nitride film, and a step of forming a silicon exnitride oxi-nitride film and a metal oxide film by oxidizing the silicon nitride film and the metal film, after said step of forming a silicon nitride film.
12. (Currently Amended) The process according to claim 4, wherein said step of forming the gate insulator on a silicon substrate further includes a second step of forming a metal film on the silicon nitride film, and a step of forming a silicon exnitride oxi-nitride film and a metal oxide film by oxidizing the silicon nitride film and the metal film, after said step of forming a silicon nitride film.
13. (Withdrawn) The process according to claim 1, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a ferroelectric film on the silicon nitride film after said step of forming a silicon nitride film.
14. (Withdrawn) The process according to claim 2, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a ferroelectric film on the silicon nitride film after said step of forming a silicon nitride film.
15. (Withdrawn) The process according to claim 3, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a ferroelectric film on the silicon nitride film after said step of forming a silicon nitride film.
16. (Withdrawn) The process according to claim 4, wherein said step of forming the gate insulator on a silicon substrate further includes a step of forming a ferroelectric film on the silicon nitride film after said step of forming a silicon nitride film.

17. (New) The process according to claim 1,
wherein the radical nitriding apparatus is further provided with a Radio Frequency (RF) induction coil installed surrounding the plasma chamber, and
wherein, in said step of forming a silicon nitride film, Radio Frequency (RF) is applied from an outside power source to the Radio Frequency (RF) induction coil.

18. (New) A process according to claim 17,
wherein the radical nitriding apparatus is further provided with a vacuum vessel communicating with one side of the plasma chamber via openings,
wherein the substrate suseptor is installed in the vacuum vessel,
wherein, in said step of forming a silicon nitride film, nitrogen radicals are introduced into the vacuum vessel by a pressure difference between the plasma chamber and the vacuum vessel, and
wherein, in said step of forming a silicon nitride film, ions leaked from the plasma chamber are deflected and restrained from reaching the silicon substrate by the ion deflecting means.